**Graphing Exponential Functions**

1. **SUBSCRIPTIONS** Subscriptions to an online arts and crafts club have been increasing by 20% every year. The club began with 40 members.

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| **Year** | 0 | 1 | 2 | 3 | 4 |
| **Subscriptions** | 40 | 48 |  |  |  |

1. **MONEY** Sam opened a savings account that compounds interest at a rate of 3% annually. Let *P* be the initial amount Sam deposited and let *t* be the number of years the account has been open.  
   1. Write an equation to find *A*, the amount of money in the account after *t* years. Assume that Sam made more additional deposits and no withdrawals.
   2. If Sam opened the account with $500 and made no deposits or withdrawals, how much is in the account 10 years later?
   3. What is the least number of years it would take for such an account to double in value?

**Solving Exponential Equations and Inequalities**

1. **BANKING** The certificate of deposit that Siobhan bought on her birthday pays interest according to the formula http://glencoe.com/sites/common_assets/mathematics/alg2_2010/worksheets/html/gln_ma_a2crmch08/gln_ma_a2crmch08_16/images/pg16_001.jpg. What is the annual interest rate?

1. **BUSINESS** Ingrid and Alberto each opened a business in 2000. Ingrid started with 2 employees and in 2003 she had 50 employees. Alberto began with 32 employees and in 2007 he had 310 employees. Since 2000, each company has experienced exponential growth.  
   1. Write an exponential equation representing the growth for each business.
   2. Calculate the number of employees each company had in 2005.
   3. Is it reasonable to expect that a business can experience exponential growth? Explain your answer.

**Logarithms and Logarithmic Functions**

1. **CHEMISTRY** The pH of a solution is found by the formula pH = -log *H*, where *H* stands for the hydrogen ion concentration in the formula. What is the pH of a solution to the nearest hundredth when *H* is 1356?
2. **GAMES** Julio and Natalia decided to play a game in which they each selected a logarithmic function and compare their functions to see which gave larger values. Julio selected the function *f*(*x*) = 10 log2 *x* and Natalia selected the function 2 log10 *x*.  
   1. Which of the functions has a larger value when *x* = 7?
   2. Which of their functions has a larger value when *x* = 1?
   3. Do you think the base or the multiplier is more important in determining the value of a logarithmic function?

**Solving Logarithmic Equations and Inequalities**

1. **POWERS** Haley tries to solve the equation log4 2*x* = 5. She got the wrong answer. What was her mistake? What should the correct answer be?

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| 1. | log4 2*x* = 5 |
| 2. | 2*x* = 45 |
| 3. | *x* = 25 |
| 4. | *x* = 32 |

**Properties of Logarithms**

1. **MENTAL COMPUTATION** Jessica has memorized log5 2 ≈ 0.4307 and log5 3 ≈ 0.6826. Using this information, to the nearest thousandth, what power of 5 is equal to 6?
2. **POWERS** A chemist is testing a soft drink. The pH of a solution is given by  
     
                                 -log10 C,  
     
   where C is the concentration of hydrogen ions. The pH of a popular soft drink is 2.5. If the concentration of hydrogen ions is increased by a factor of 100, what is the new pH of the solution?